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Research: Educational and Psychological Aspects

Ethnic aspects of emotional distress in patients with diabetes – the Amsterdam Health Monitor Study

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Abstract

Aims Depression and anxiety are relatively common in patients with diabetes, but it is unclear whether migrant patients with diabetes are at increased risk for emotional distress. We determined levels of emotional distress in patients with diabetes with a Turkish, Moroccan or Dutch ethnic background and compare distress levels with healthy control subjects. Among patients with diabetes, we examined demographic and clinical correlates of higher levels of emotional distress.

Methods Cross-sectional data were collected within the framework of the population-based Amsterdam Health Monitor Survey. Adult participants were interviewed to assess demographics, presence of chronic disease(s) and ethnic background. Emotional distress was determined with the Kessler psychological distress scale. Blood was drawn to determine HbA_{1c}, glucose, HDL and total cholesterol. Anthropometrics and blood pressure were assessed during a medical examination.

Results The total sample comprised of 1736 participants. The prevalence of emotional distress was significantly higher in participants with diabetes (31%) compared with healthy participants (19%). Increased levels of emotional distress were reported by 38% of the Turkish, 35% of the native Dutch and 29% of the Moroccan patients with diabetes. Among patients with diabetes, the presence of two or more co-morbid chronic diseases was most strongly associated with higher levels of emotional distress, whereas glycaemic control, cholesterol, blood pressure or waist circumference were not.

Conclusions Emotional distress affects approximately one third of adult patients with diabetes living in Amsterdam. Having multiple co-morbid diseases seems related to more emotional distress among these patients, while ethnicity and diabetes-related characteristics are not.

Diabet. Med. 30, e25–e31 (2013)

Introduction

Depression and anxiety are two common forms of emotional distress that often co-occur [1]. Depression and anxiety can be measured with self-report questionnaires and with a psychiatric diagnostic interview. Persons with a high score on a self-report measure can suffer from subthreshold depression/anxiety or a mood/anxiety disorder. However, for the diagnosis of a mood/anxiety disorder, a psychiatric diagnostic interview is required. Emotional distress is an

important co-morbid health problem in people with diabetes. In controlled studies, the prevalence of a mood disorder was 12% for people with Type 1 diabetes compared with 3% for control subjects [2]. Moreover, the risk of high depression scores among people with Type 2 diabetes was 60% higher compared with people without diabetes, affecting up to 24% of the patients with Type 2 diabetes [3]. Compared with persons who do not have diabetes, people with Type 2 diabetes have a 24% increased risk of developing depression [4]. Results from the community-based Longitudinal Aging Study Amsterdam showed that the percentage of people with high depression scores was particularly increased in patients

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with diabetes with co-morbid disease(s) (20%), but not in those with Type 2 diabetes only (8%) [5]. Among patients with diabetes, depression was found to be associated with an impaired quality of life, an increased risk for the development of vascular complications and higher mortality rates [6–8]. In a systematic review based on 18 controlled studies, generalized anxiety disorder also appeared to be relatively common, presenting in 14% of patients with diabetes, while another 27% of patients with diabetes suffered from subclinical anxiety disorders [9]. An important limitation of most of the studies into the prevalence of depression or anxiety in diabetes is that selected samples were used [9]. Results from community-based studies are still scarce. Moreover, little is known about emotional distress in patients with diabetes from ethnic minority groups. In the Netherlands, the majority of the (non-Western) labour immigrants come from Morocco or Turkey [10]. Diabetes is known to be more common among people who migrated from Morocco or Turkey [11]. The prevalence of depression appeared to be relatively high in these migrant groups [12], possibly because of discrimination, poor socio-economic status, poor living conditions, migration stress, language barriers and/or a poorer health status. Recent results showed that 50% (39 of 78) of migrant outpatients with diabetes from Turkish, Moroccan, Surinam, Indonesian or Dutch Antilles descent had elevated depression scores, compared with 31% of the patients with diabetes with a native Dutch ethnic background [13]. To the best of our knowledge, no other studies have focused on the prevalence of emotional distress among migrant groups in the European continent, comparing patients with diabetes with healthy subjects.

The three aims of the present study were: (1) to assess the prevalence of emotional distress among Moroccan, Turkish and native Dutch patients with diabetes; (2) to determine the odds of having a high level of emotional distress, comparing patients with diabetes with those who have no chronic disease at all, by sex and ethnic background (Dutch, Moroccan or Turkish); and (3) to explore demographic and clinical characteristics that are associated with emotional distress in patients with diabetes.

Based on the results of earlier studies [2–5], we expected to find higher levels of emotional distress in people with diabetes, compared with healthy control subjects, and also to find higher levels of emotional distress among immigrants with diabetes, compared with native Dutch patients with diabetes.

Patients and methods

Data collection

The data used for this study were obtained from the Amsterdam Public Health Service (GGD Amsterdam). The GGD Amsterdam has conducted a cross-sectional study to monitor the health of the Amsterdam general population aged 18 years and over. Data collection procedures and response

have been described in detail previously [14,15]. In short, the study sample was drawn from the Amsterdam municipal registers in five city districts, representative of the total population of Amsterdam in terms of ethnic mix, sex and age. The sample was stratified by ethnic mix and five age groups (18–34, 35–44, 45–54, 55–64 or older than 64 years). Within each stratum a random sample was drawn. The Turkish and Moroccan groups were purposely over sampled to ensure sufficient numbers of individuals from these groups. In 2004, the individuals of the sample were invited for an interview (in language of choice) and medical examination. The final response rate was 44%; moreover, response-rate was 46% in the Dutch, 50% in Turks and 39% in Moroccans [14,15].

Measures

During the interview, the following topics were assessed: diagnosis of diabetes, diabetes treatment, age, sex, ethnicity, habitation, level of education, income and smoking. During the interview, subjects were asked if they had had or were still suffering from the following conditions (yes/no): stroke or transient ischaemic attack (TIA); myocardial infarction; other severe cardiac disease; cancer; hypertension; migraine or severe headache; stricture of the blood vessels in the stomach or legs (no varicose veins); asthma or chronic obstructive pulmonary disease; psoriasis; chronic eczema; incontinence; serious or persistent back complaints (including hernia); gon- or cox-arthritis; rheumatoid arthritis; other severe disorder of the neck or shoulder; other severe disorder of the wrist, elbow or hand. For stroke/transient ischaemic attack, myocardial infarction, other severe cardiac disease, cancer, and hypertension the following question was added: have you received medical treatment in the past 12 months? (yes/no). For the other chronic diseases: was the disease diagnosed by a medical doctor (yes/no)? A sum score of chronic diseases ‘treated/under control or assessed by a medical doctor’ was then created, allowing two missing items.

Emotional distress was assessed using the validated Kessler psychological distress scale (K-10), an overall measure of distress based on 10 questions about anxiety and depressive symptoms that a person has experienced in the past 4 weeks [16,17]. The 10 item K-10 scale has five response categories, with total score ranging from 10 to 50.

In our study, a K-10 score of ≥ 20 was used as cut-off for elevated distress. Interviews were performed in Dutch, Berber, Arabic or English. Where possible, validated translations were used and some translations were validated afterwards (e.g. the Turkish translation of the K-10) [16]. The questionnaires were translated into Turkish, Arabic and English and were back translated into Dutch by a different translator and checked by the research group.

By physical examination, the following variables were assessed: body weight, body height, waist and hip circumference, systolic blood pressure and diastolic blood pressure, both in duplicate. Blood samples (non-fasting) were drawn to

determine glycosylated haemoglobin (HbA_{1c}) as an index of glycaemic control over the past 6–9 weeks; glucose (mmol/l), HDL cholesterol and total cholesterol (mmol/l). Hypercholesterolaemia was defined as: (1) self-report of hypercholesterolaemia with use of medication or (2) serum total cholesterol \geq 6.5 mmol/l.

Diabetes was based on both questionnaire data and blood levels of non-fasting glucose and HbA_{1c}. Self-reported diabetes and the use of anti-diabetic medication (oral hypoglycaemic agents and/or insulin) was defined as diagnosed diabetes. Undiagnosed diabetes was based on non-fasting glucose levels above 11.0 mmol/l and HbA_{1c} levels above 48 mmol/mol (6.5%).

Statistical analyses

All statistical analyses were performed using SPSS 12.0.1 for windows (SPSS Inc., Chicago, IL, USA). First, we compared

demographical and clinical data and levels of emotional distress between participants with diabetes and participants without chronic disease(s), using a χ^2 -test (for nominal variables), Student's two-sample *t*-test (for normally distributed continuous variables) or a Mann–Whitney *U*-test (for skewed distributed continuous variables). A *P*-value $<$ 0.05 was regarded as statistically significant. Secondly, logistic regression analyses were carried out to compare the odds for a high level of emotional distress (K-10 score \geq 20), comparing subjects with diabetes and subjects without a chronic disease. Odds ratios with 95% confidence intervals were calculated and were adjusted for potential confounding variables. In addition, these analyses were performed stratified by sex and ethnicity and adjusted for potential confounders. Potential confounders were based on literature, and factors that were significantly different between ethnic groups (as presented in Table 1) were also included as potential confounders in these analyses. Thirdly, stepwise

Table 1 Characteristics of the study sample in the following subgroups: without any chronic disease; with \geq 1 chronic disease; with diabetes

| | No chronic disease | \geq 1 chronic disease | Diabetes |
|---|--------------------|--------------------------|---------------|
| <i>n</i> (not weighted) | 585 | 772 | 146 |
| Psychological distress | | | |
| K-10 score \geq 20†† | 19%** | 35% | 31% |
| K-10 score [median (interquartile range)] | 13 (11–18)*** | 16 (12–22) | 15 (12–23) |
| Demographics | | | |
| Age, years [mean (SD)] | 44 (14)*** | 51 (14)*** | 59 (10) |
| Male sex | 52% | 38%*** | 56% |
| Ethnicity | | | |
| Dutch | 35.0%*** | 32.0%*** | 13.7% |
| Turkish | 19.7% | 27.7% | 28.8% |
| Moroccan | 21.5% | 17.2% | 39.0% |
| Other | 23.8% | 23.1% | 18.5% |
| Living alone (or other) | 28% | 31% | 27% |
| Low education | 18%*** | 32%*** | 51% |
| Income $<$ modal | 43%*** | 60%*** | 80% |
| Clinical values | | | |
| HbA _{1c} , mmol/mol [median (interquartile range)] | 37 (34–39)*** | 38 (36–41)*** | 57 (49–67) |
| HbA _{1c} , % [median (interquartile range)] | 5.5 (5.3–5.7)*** | 5.6 (5.4–5.9)*** | 7.4 (6.6–8.3) |
| HDL cholesterol, mmol/l [median (interquartile range)] | 1.4 (1.1–1.7)*** | 1.5 (1.2–1.7)*** | 1.2 (1.1–1.4) |
| Total/HDL cholesterol ratio [mean (SD)] | 4.0 (1.4) | 4.1 (1.3) | 4.2 (1.1) |
| BMI, kg/m ² [median (interquartile range)] | 25.5 (4.59)*** | 27.6 (5.2)*** | 29.8 (5.3) |
| Waist circumference, cm [mean (SD)] | 90 (13)*** | 95 (14)*** | 105 (12) |
| Systolic blood pressure, mmHg [median (interquartile range)] | 129 (20)*** | 135 (24)*** | 147 (23) |
| Diastolic blood pressure, mmHg [median (interquartile range)] | 81 (11) | 83 (11) | 82 (11) |
| Self-reported co-morbidity† | | | |
| \geq 1 chronic disease | — | — | 80% |
| 1 chronic disease | — | 46%** | 26% |
| 2 chronic diseases | — | 25% | 20% |
| $>$ 2 chronic diseases | — | 29% | 34% |
| Cardiovascular diseases‡ | — | 7%*** | 18% |
| Hypertension | — | 25%*** | 46% |
| Musculoskeletal diseases§ | — | 54%* | 44% |
| Hypercholesterolaemia¶ | 17%*** | 26%*** | 46% |

P* $<$ 0.05; *P* $<$ 0.01; ****P* $<$ 0.001 compared with the group with diabetes.

†Under control/assessed by a medical doctor.

‡Stroke, transient ischaemic attack, myocardial infarction or other severe cardiac disease.

§Severe or persistent back disorder, gon- or coxarthrosis, rheumatoid arthritis, other severe disorder of the neck, shoulder, wrist, elbow or hand.

¶Based on either self-report or serum cholesterol

††K-10, Kessler 10 (emotional distress) questionnaire.

linear regression analyses in subjects with diabetes were performed to test whether the level of emotional distress could be explained by the following set of independent variables: (1) age, female sex, ethnicity, habitation, education, income, smoking; (2) HbA_{1c}, total cholesterol, BMI, blood pressure; (3) number of chronic disease(s) (0 vs. 1 or more). Step 3 was carried out again with 'number of chronic diseases'; or cardiovascular diseases, or hypertension, or musculoskeletal diseases. Variance inflation factor and tolerance values were used to indicate multi-collinearity. We used the rule of thumb that tolerance should be > 0.20 and variance inflation factor < 4 to suggest multi-collinearity. Missing values were excluded pairwise.

Results

The total study sample comprised of 1736 subjects, of whom 55% were women and the mean age was 46 ± 15 years. With respect to ethnic origin, 30% were Dutch, 21% were Moroccan, 26% were Turkish and 23% were of other ethnic origin. Of these 1736 subjects, 41 were excluded because they refused the medical examination, 163 subjects were excluded for missing information on self-report of diabetes and another 12 subjects were excluded because of missing information on either sex, age or ethnicity. Of the remaining 1520 subjects, 134 had diagnosed diabetes, 12 had undiagnosed diabetes and 1374 had no diabetes. Of all subjects, 585 reported having no chronic disease diagnosed by a medical doctor, while 17 were excluded because of missing information on chronic diseases. The analyses were thus performed on 1503 subjects.

In Table 1, the characteristics of the patients with diabetes are compared with those with no chronic disease or one or more other chronic disease(s). Mean HbA_{1c} levels, BMI, waist circumference and age were significantly higher in the partic-

ipants with diabetes, compared with both control groups without diabetes. Furthermore, patients with diabetes also had a significantly lower income, lower mean HDL cholesterol level and a higher systolic blood pressure compared with both groups without diabetes. A relatively high percentage of Dutch patients with diabetes reported that they lived alone (63%), whereas few patients in this group had low education (7%) compared with Turkish and Moroccan patients with diabetes (60 and 69%, respectively; data not shown).

Prevalence of emotional distress

To study the potential impact of having diabetes, levels of emotional distress were compared between patients with diabetes and participants with no chronic disease. Higher levels of emotional distress were found in patients with diabetes (31%) compared with the participants with no chronic disease (19%), but not compared with those with one or more other chronic disease(s) (35%). In a next step, to investigate possible ethnic differences in the potential impact of diabetes, the results were stratified by sex and ethnic background (native Dutch, Turkish, Moroccan or 'other') (Table 2). Among the native Dutch patients with diabetes, 35% of the patients reported a high level of emotional distress, compared with 38% of the Turkish patients with diabetes and 29% of the Moroccan patients with diabetes. In the group of participants without a chronic disease, emotional distress appeared to be particularly common in those with a Turkish background (25%), compared with Dutch (16%) and Moroccan participants (18%).

In the unadjusted analyses, among Dutch participants, the odds of emotional distress were significantly higher among those with diabetes compared with those without a chronic disease (Table 2) (odds ratio 2.88, 95% CI 1.07–7.77). In Moroccan and Turkish participants, having diabetes was

Table 2 Rates of increased emotional distress* in total sample, by ethnicity (Dutch, Turkish and Moroccan) and by sex, in subjects with diabetes compared with subjects without chronic disease

| Study sample | Sample groups | n | Increased emotional distress | | |
|---------------|--------------------|-----|------------------------------|------------------|---------------------|
| | | | Unweighted | % | Odds ratio (95% CI) |
| Total sample | No chronic disease | 578 | 19% | 1.0 (—) | 1.0 (—) |
| | Diabetes | 140 | 31% | 1.97 (1.31–2.98) | 2.47 (1.32–4.61) |
| Male | No chronic disease | 303 | 18% | 1.0 (—) | 1.0 (—) |
| | Diabetes | 77 | 29% | 1.84 (1.04–3.28) | 2.36 (1.05–5.29) |
| Female | No chronic disease | 275 | 20% | 1.0 (—) | 1.0 (—) |
| | Diabetes | 63 | 35% | 2.15 (1.18–3.90) | 2.99 (1.01–8.83) |
| By ethnicity: | | | | | |
| Dutch | No chronic disease | 203 | 16% | 1.0 (—) | 1.0 (—) |
| | Diabetes | 20 | 35% | 2.88 (1.07–7.77) | 3.04 (0.86–10.79) |
| Turkish | No chronic disease | 114 | 25% | 1.0 (—) | 1.0 (—) |
| | Diabetes | 40 | 38% | 1.84 (0.85–3.98) | 2.45 (0.73–8.25) |
| Moroccan | No chronic disease | 125 | 18% | 1.0 (—) | 1.0 (—) |
| | Diabetes | 56 | 29% | 1.77 (0.85–3.70) | 1.62 (0.39–6.73) |
| Other | No chronic disease | 136 | 19% | 1.0 (—) | 1.0 (—) |
| | Diabetes | 24 | 25% | 1.41 (0.51–3.90) | 3.29 (0.81–13.36) |

*Adjusted for demographics (age, sex, ethnicity, living alone, low education, income < modal).

also associated with higher levels of emotional distress (odds ratio 1.77 and 1.84, respectively), but the association was less strong and not significant. The strength of these associations tended to increase after adjustment for potential confounders in the Dutch (odds ratio 3.04, 95% CI 0.86–10.79) and the Turkish patients (odds ratio 2.45, 95% CI 0.73–8.25), but decreased somewhat in the Moroccan group (odds ratio 1.62, 95% CI 0.39–6.73).

Factors associated with emotional distress

We tested with stepwise multivariate linear regression analyses which demographic and clinical characteristics were associated with higher levels of emotional distress in patients

with diabetes (Table 3). In the analyses in the total sample of people with diabetes, ethnicity was not related to emotional distress, while lower income and being a smoker were associated with higher emotional distress scores. In the stepwise linear regression models, mainly having multiple co-morbid chronic diseases was a significant predictor of higher levels of emotional distress in patients with diabetes.

Discussion

We found that 31% of a large, multi-ethnic sample of patients with diabetes living in Amsterdam reported high levels of emotional distress. In contrast to an earlier study showing that depression is relatively common in

Table 3 Stepwise multiple regression analyses predicting psychological distress severity (K10) by demographic variables, clinical variables and co-morbid chronic disease in 140 patients with diabetes

| | Bivariate associations | | | Model 1 Demographic variables only | | | Model 2 Demographic variables and clinical variables | | | Model 3 Demographic variables, clinical variables and 'chronic diseases' | | |
|---|------------------------|----------|-----------------|--|----------|-----------------|--|----------|-----------------|---|----------|-----------------|
| | β | <i>t</i> | <i>P</i> -value | β | <i>t</i> | <i>P</i> -value | β | <i>t</i> | <i>P</i> -value | β | <i>t</i> | <i>P</i> -value |
| Demographic variables | | | | | | | | | | | | |
| Age, years | 0.06 | 0.65 | 0.514 | 0.08 | 0.65 | 0.518 | 0.12 | 0.86 | 0.396 | 0.11 | 0.78 | 0.439 |
| Female sex | 0.06 | 0.67 | 0.503 | 0.06 | 0.53 | 0.598 | 0.08 | 0.64 | 0.524 | 0.05 | 0.44 | 0.665 |
| Ethnicity (reference = Dutch) | | | | | | | | | | | | |
| Turkish | 0.15 | 1.20 | 0.233 | 0.21 | 0.89 | 0.375 | 0.21 | 0.82 | 0.417 | 0.13 | 0.52 | 0.605 |
| Moroccan | 0.01 | 0.11 | 0.912 | 0.16 | 0.61 | 0.542 | 0.15 | 0.52 | 0.602 | 0.12 | 0.45 | 0.656 |
| Other | 0.01 | 0.08 | 0.936 | 0.12 | 0.73 | 0.468 | 0.11 | 0.62 | 0.535 | 0.10 | 0.59 | 0.556 |
| Living alone (or other) | 0.08 | 0.97 | 0.332 | 0.10 | 0.74 | 0.462 | 0.09 | 0.68 | 0.497 | 0.10 | 0.75 | 0.455 |
| Low education | 0.09 | 0.93 | 0.354 | 0.04 | 0.29 | 0.772 | 0.06 | 0.39 | 0.701 | 0.08 | 0.52 | 0.603 |
| Income < modal | 0.19 | 2.02 | 0.046 | 0.13 | 1.02 | 0.312 | 0.12 | 0.91 | 0.366 | 0.14 | 1.03 | 0.308 |
| Current smoking | 0.19 | 2.18 | 0.031 | 0.26 | 2.00 | 0.049 | 0.24 | 1.76 | 0.082 | 0.18 | 1.41 | 0.163 |
| Clinical variables | | | | | | | | | | | | |
| HbA _{1c} , % | -0.08 | -0.94 | 0.349 | | | | -0.07 | -0.59 | 0.560 | 0.00 | 0.00 | 1.000 |
| HDL cholesterol, mmol/l | -0.07 | -0.76 | 0.450 | | | | -0.07 | -0.54 | 0.590 | -0.12 | -0.94 | 0.351 |
| Waist circumference, cm | -0.01 | -0.11 | 0.910 | | | | -0.05 | -0.38 | 0.704 | -0.10 | -0.84 | 0.403 |
| Systolic blood pressure, mmHg | -0.02 | -0.28 | 0.777 | | | | -0.04 | -0.26 | 0.793 | -0.09 | -0.60 | 0.549 |
| Diastolic blood pressure, mmHg | 0.01 | 0.11 | 0.912 | | | | 0.06 | 0.46 | 0.651 | 0.05 | 0.34 | 0.736 |
| Self-reported co-morbidity* | | | | | | | | | | | | |
| Number of chronic diseases (reference = 0) | | | | | | | | | | | | |
| 1 chronic disease | 0.11 | 1.04 | 0.299 | | | | | | | 0.13 | 0.86 | 0.392 |
| 2 chronic diseases | 0.31 | 3.05 | 0.003 | | | | | | | 0.32 | 2.15 | 0.035 |
| > 2 chronic diseases | 0.42 | 3.94 | 0.000 | | | | | | | 0.41 | 2.71 | 0.009 |
| Cardiovascular diseases† | 0.14 | 1.61 | 0.110 | | | | | | | 0.10 | 0.84 | 0.403 |
| Hypertension | 0.25 | 2.97 | 0.004 | | | | | | | 0.28 | 2.32 | 0.024 |
| Musculoskeletal diseases‡ | 0.14 | 1.64 | 0.104 | | | | | | | 0.13 | 1.11 | 0.271 |
| Hypercholesterolaemia§ | 0.11 | 1.21 | 0.227 | | | | | | | 0.13 | 1.11 | 0.271 |
| R ² | | | | | | 11.0% | | | 12.2% | | | 23.4% |
| Adjusted R ² | | | | | | 0.3% | | | -5.3% | | | 3.9% |
| R ² change | | | | | | 11.0% | | | 1.3% | | | 11.1% |
| <i>F</i> change | | | | | | 1.03 | | | 0.20 | | | 3.25 |
| <i>P</i> -value change | | | | | | 0.425 | | | 0.962 | | | < 0.05 |
| <i>P</i> -value | | | | | | 0.425 | | | 0.769 | | | 0.287 |

*Under control/assessed by a medical doctor.

†Stroke, transient ischaemic attack, myocardial infarction or other severe cardiac disease.

‡Severe or persistent back disorder, gon- or coxarthrosis, rheumatoid arthritis, other severe disorder of the neck, shoulder, wrist, elbow or hand.

§Based on either self-report or serum cholesterol.

¶Included instead of 'number of chronic diseases': cardiovascular disease, hypertension and musculoskeletal diseases included in one model, hypercholesterolaemia in a separate model.

immigrants [12], emotional distress appeared not to be more common in Moroccan (29%) and Turkish patients with diabetes (38%), compared with native Dutch patients with diabetes (35%) living in Amsterdam. Compared with healthy control subjects, the odds for emotional distress were higher in Dutch patients with diabetes (odds ratio 2.88), and tended to be higher in Moroccan patients with diabetes (odds ratio 1.77) or Turkish patients with diabetes (odds ratio 1.84), but was not statistically significant. The fact that emotional distress was relatively common in Turkish participants without a chronic disease (25%) might partially explain why diabetes was not significantly associated with a higher risk for emotional distress in those with a Turkish background. The relatively small sample size should be regarded as a limitation, as in this analysis 20 Dutch subjects with diabetes were compared with 42 Turkish and 57 Moroccan subjects with diabetes. Having co-morbid disease(s) was the most important factor that was associated with higher levels of emotional distress. Clinical characteristics (glycaemic control, cholesterol levels) were not associated with emotional distress. This finding might be explained by the fact that levels of HbA_{1c} and cholesterol were reasonably good in this group. Moreover, associations between emotional distress and glycaemic control/lipids are generally small. The prevalence rates found in the present study are relatively high compared with the results of four other Dutch studies that have determined the prevalence of depression in predominantly native samples of Dutch patients with Type 2 diabetes, treated in primary healthcare settings ranging from 17 to 30% [5,18–20]. Our relatively high prevalence rates may be explained by the fact that, in the present study, we measured emotional distress with the K-10, covering both depressive symptoms and anxiety [16]. Moreover, we studied a large sample of people living in the city of Amsterdam, and the prevalence of depression and anxiety is known to be higher in urban populations [21].

In the univariable analyses in the group of participants with diabetes, lower income and being a smoker were associated with higher emotional distress scores. In the stepwise linear regression models, in particular having multiple co-morbid chronic diseases was a significant predictor of higher levels of emotional distress. These findings are in line with earlier Dutch results from the Longitudinal Aging Study Amsterdam study [5], Hoorn Study [18], Utrecht Health Project [19] and the DIAZOB study [20].

Some limitations of our study need to be mentioned. Our findings are based on a small sample of specific immigrant groups, and as such they should be replicated in a larger sample, and perhaps across other countries and immigrant groups. The cross-sectional design does not allow for making causal inferences. Most likely the relationship between Type 2 diabetes and emotional distress is bidirectional [22,23]. The assessment of diabetes was based on self-report (with no distinction between Type 1 and Type 2) and

random glucose levels, rather than fasting glucose levels or an oral glucose tolerance test, which is considered the gold standard for the diagnosis of Type 2 diabetes. This may have resulted in selection bias: participants with short diabetes duration and few diabetes complications are likely to be under-represented. Another form of bias may be related to depression status. Participants who suffered from more severe depression might have been less willing to participate and may thus also be under-represented. Yet, it is uncertain how selection bias or non-response may have influenced the results. Our finding that the presence of multiple chronic conditions was the main determinant of emotional distress is in concert with Van der Wurff *et al.* [12], who found that the presence of a chronic disease was associated with increased risk for depression in native Dutch (odds ratio 3.2, 95% CI 1.2–8.5), Turkish immigrants (odds ratio 3.4, 95% CI 1.8–6.5) and Moroccan immigrants (odds ratio 2.1, 95% CI 1.5–5.4). However, Van der Wurff and colleagues [12] did not report the odds ratio for depression for people with diabetes only, but used a dichotomous (yes/no) composite score based on 14 common chronic diseases, including diabetes.

We conclude that emotional distress is a common co-morbid health problem in patients with diabetes with a native-Dutch background, but also in those with a Turkish or Moroccan ethnic background, who are living in Amsterdam. Emotional distress affects approximately one third of these patients with diabetes. Interestingly, emotional distress in the present study was not more common in immigrants vs. native Dutch patients with diabetes.

In many patients with Type 2 diabetes depression is chronic or recurrent [24]. Moreover, the low recognition rates of depression and anxiety in patients with diabetes are also a concern [25], underscoring the importance of systematic monitoring or screening of emotional well-being as part of routine diabetes care [26]. However, to be effective, screening should be combined with discussion of outcomes and a referral pathway [27–29] linked to a care pathway. It is currently unknown whether detection of emotional distress and referral rates in immigrants with diabetes differ from non-migrant patients with diabetes. There is evidence to suggest that some ethnic groups have more difficulty accessing mental health services [30]. Future studies should investigate which screening and subsequent intervention strategies are the most effective to tackle the problem of increased level of emotional distress in patients with diabetes with different ethnic backgrounds.

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Competing interests

None declared.

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